Appendix J
Water Quality Objectives for Bacteria Indicators

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Background

Under section 304(a) of the Clean Water Act, USEPA is required to publish water quality criteria accurately reflecting the latest scientific knowledge for the protection of human health and aquatic life. Prior to 1986, USEPA recommended bacteria criteria based on fecal coliforms to protect human health[1]. In 1986, USEPA recommended the use of criteria based on E. coli for fresh waters and enterococci for fresh and marine waters rather than the use of criteria based on fecal coliforms[2]. USEPA recommended this change in the use of bacteria indicator organisms because USEPA studies demonstrated that E. coli and enteroccoci are better predictors of the presence of gastrointestinal illness-causing pathogens than fecal and total coliforms and hence provide a better means of protecting human health. Subsequent supporting research led USEPA to reaffirm these findings in 2002.[3] USEPA strongly recommends the replacement of water quality objectives based on fecal or total coliforms with objectives based on enterococci and E. coli. As described below, the Basin Plan for the San Diego Region contains objectives based on fecal and total coliforms as well as enterococci and E. coli for inland surface waters, enclosed bays and estuaries, and coastal lagoons.

I. REC-1 Water Quality Objectives in the San Diego Region

The REC-1 water quality objectives for bacterial indicators applicable in the San Diego Region are contained in the Ocean Plan and in the San Diego Regional Board's Basin Plan. The objectives contained in both are derived from water quality criteria promulgated by USEPA in 1976 and 1986. The Ocean Plan currently contains REC-1 objectives for total and fecal coliforms. The Basin Plan currently contains REC-1 objectives for total coliforms, fecal coliforms, enterococci, and E. coli as shown below.

REC-1
Ocean Waters (from Ocean Plan)

Fecal Coliforms: Fecal coliform density based on a minimum of not less than five samples for any **30-day period**, shall not exceed a **geometric mean of 200** per 100 ml nor shall more than **10%** of the total samples during any **60-day period** exceed **400** per 100 ml.

Total Coliforms: Samples shall have a density of total coliform organisms less than **1,000** per 100 ml (10 per ml); provided that not more than **20%** of the samples at any sampling station, in any **30-day period**, may exceed **1,000** per 100 ml (10 per ml), and provided further that no **single sample** when verified by a repeat sample taken within 48 hours shall exceed **10,000** per 100 ml (100 per ml).

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[1] Quality Criteria for Water. USEPA 1976
[2] Ambient Water Quality Criteria for Bacteria. USEPA 1986
[3] Implementation Guidance for Ambient Water Quality Criteria for Bacteria. May 2002 DRAFT.

<u>**REC-1**</u>
<u>**Inland Surface Waters, Enclosed Bays & Estuaries, and Coastal Lagoons (from Basin Plan)**</u>

Fecal Coliforms / Fresh or Marine Waters: Fecal coliform concentration, based on a minimum of not less than five samples for any **30-day period**, shall not exceed a **log mean of 200** per 100 ml, nor shall more than **10%** of total samples during any **30-day period** exceed **400** per 100 ml.

Total Coliforms / bays and estuaries only: Coliform organisms shall be less than **1,000** per 100 ml (10 per ml); provided that not more than **20%** of the samples at any station, in any **30-day period**, may exceed **1,000** per 100 ml (10 per ml), and provided further that no **single sample** when verified by a repeat sample taken within 48 hours shall exceed **10,000** per 100 (100 per ml).

Enterococci / Fresh Waters: In fresh water, the **geometric mean** of enterococci shall not exceed **33** per 100 ml. The single sample maximum allowable density in designated beach areas is **61** per 100 ml with a confidence level of 75%.

Enterococci / Marine Waters: In marine waters, the **geometric mean** of enterococci shall not exceed **35** per 100 ml. The single sample maximum allowable density in designated beach areas is **104** per 100 ml with a confidence level of 75%.

E. coli / Fresh Waters: In fresh water, the **geometric mean** of E. coli shall not exceed **126** per 100 ml. The single sample maximum allowable density in designated beach areas is **235** per 100 ml with a confidence level of 75%.

II. *REC- 2 Water Quality Objectives in the San Diego Region*

The REC-2 water quality objectives for bacterial indicators applicable in the San Diego Region are contained in the San Diego Regional Board's Basin Plan and are derived from water quality criteria promulgated by USEPA in 1976.

<u>**REC-2**</u>
<u>**Inland Surface Waters, Enclosed Bays & Estuaries, and Coastal Lagoons (from Basin Plan)**</u>

Fecal Coliforms / Fresh or Marine Waters: In waters designated for non-contact recreation (REC-2) and not designed for contact recreation (REC-1), the average fecal coliform concentrations for any **30-day period**, shall not exceed **2,000** per 100 ml, nor shall more than **10%** of total samples collected during any **30-day period** exceed **4,000** per 100 ml.

III. *Shellfish Harvesting Water Quality Objectives in the San Diego Region*

The SHELL water quality objectives for bacterial indicators applicable in the San Diego Region where shellfish may be harvested for human consumption are contained in the Ocean Plan and in the San Diego Regional Board's Basin Plan. Both are derived from water quality criteria promulgated by USEPA in 1976.

<u>**SHELL**</u>
<u>**Ocean Waters (from Ocean Plan)**</u>

Total Coliforms: The median total coliform density throughout the water column shall not exceed **70** per 100 ml, and not more than **10%** of the samples shall exceed **230** per 100 ml.

SHELL
Enclosed Bays & Estuaries and Coastal Lagoons (from Basin Plan)

Total Coliforms / Marine Waters: The median total coliform concentration throughout the water column for an **30-day period** shall not exceed **70** per 100 ml nor shall more than **10%** of the samples collected during any **30-day period** exceed **230** per 100 for a five-tube decimal dilution test or 330 per 100 ml when a three-tube decimal dilution test is used.